

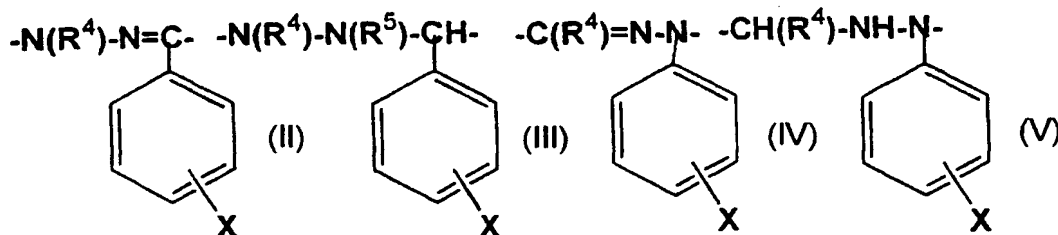
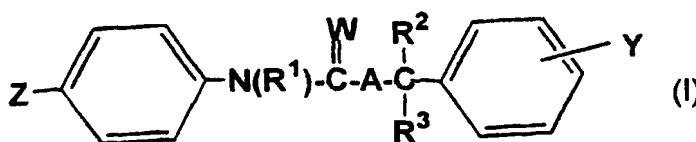
(19) World Intellectual Property Organization  
International Bureau(43) International Publication Date  
11 January 2001 (11.01.2001)

PCT

(10) International Publication Number  
WO 01/01781 A1

- (51) International Patent Classification<sup>7</sup>: A01N 47/34, 37/44
- (21) International Application Number: PCT/US00/17895
- (22) International Filing Date: 28 June 2000 (28.06.2000)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
11/190671 5 July 1999 (05.07.1999) JP
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- (81) Designated States (national): AT, AU, BR, CA, CH, CR, DE, DK, ES, FI, GB, HU, IL, IN, KE, MX, NO, NZ, PL, PT, SE, TR, US, ZA, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
- Published:  
— With international search report.  
— Before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments.
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: ANT CONTROLLERS AND METHOD FOR APPLICATION THEREOF



(57) Abstract: The present invention provides an excellent ant controller for protecting wooden materials such as trees, board fences, sleepers, etc. and structures such as shrines, temples, houses, outhouses, factories, etc. from termites, and for controlling ants doing harm to crops or humans, which contains as active ingredient thereof a hydrazine derivative represented by general formula (I) [wherein A represents one of formulas (II), (III), (IV), and (V), (wherein R<sup>4</sup> and R<sup>5</sup> are H, C<sub>1</sub>-C<sub>6</sub> alkyl, etc.; X is 1 to 5 substituents selected from H, halogen and (halo) C<sub>1</sub>-C<sub>6</sub> alkyl); R<sup>1</sup> is H or C<sub>1</sub>-C<sub>6</sub> alkyl; R<sup>2</sup> and R<sup>3</sup> are H, OH, C<sub>1</sub>-C<sub>6</sub> alkyl, phenylcarbonyl, etc.; Y is 1 to 5 substituents selected from H, halogen, nitro and cyano; Z is halogen, cyano, C<sub>1</sub>-C<sub>6</sub> alkyl, etc.; and W is O or S]; and a method for application of the ant controller.

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ANT CONTROLLERS AND METHOD FOR  
APPLICATION THEREOF

5

BACKGROUND OF THE INVENTION  
FIELD OF THE INVENTION

The present invention relates to novel ant  
controller containing a hydrazine derivative as an  
10 active ingredient and to a method for application of the  
ant controller.

RELATED ART

The hydrazine derivatives represented by the  
15 formula (I) which can be used as active ingredient of  
the ant controllers of the present invention are known  
compounds disclosed in JP-A-5-4958, JP-A-5-17428, JP-A-  
5-32603, JP-A-5-262712, etc. In these patents, it is  
described that these derivatives have an insecticidal  
20 activity as agrihorticultuarl insecticides against  
LEPIDOPTERA such as diamondback moth, rice leafroller,  
etc., HEMIPTERA such as tea green leafhopper, pear lace  
bug, etc., COLEOPTERA such as twenty-eight-spotted  
ladybird, maize weevil, etc., DIPTERA such as melon fly,  
25 house fly, house mosquito, etc., and TYLENCHIDA such as  
coffee root-lesion nematode, root-knot nematode, etc.

Any of these patent gazettes, however, does  
neither describe nor suggest that said hydrazine  
derivatives have a marked insecticidal effect against

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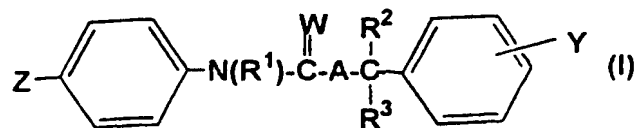
5 ISOPTERA such as formosan subterranean termite, kolbe, etc., HYMENOPTERA such as cabbage sawfly, Carpenter ant, etc., ORTHOPTERA such as Japanese cockroach, field cricket, rice grasshopper, etc., and PSOCOPTERA such as large pale booklouse, etc.

10 SUMMARY OF THE INVENTION

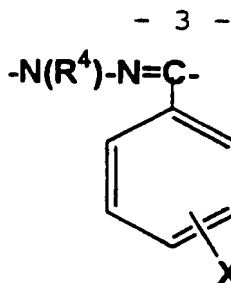
The present inventors have conducted extensive studies with the aim of creating a novel ant controller having a marked controlling effect upon ants doing harm to the wooden materials constituting houses, furniture,  
15 etc. or crops and human being. As a result, it has been found that some of the hydrazine derivatives described in the above-mentioned prior art have a marked insecticidal effect upon termites and ants. The present invention has been accomplished on the basis of this  
20 findings.

DETAILED DESCRIPTION OF THE INVENTION

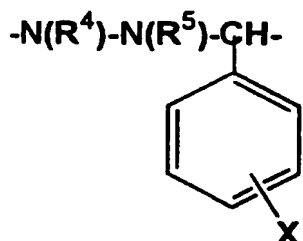
The present invention relates to ant controllers containing as active ingredient thereof a hydrazine derivative represented by the following  
25 formula (I) and method for application of the ant controllers:



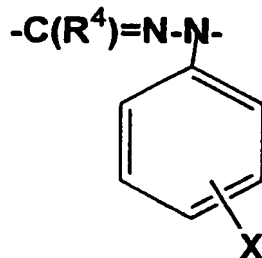
wherein A represents:



- 5 (wherein  $R^4$  represents hydrogen atom or  $C_1-C_6$  alkyl group, and  $X$  represents 1 to 5, same or different substituents selected from the group consisting of hydrogen atom, halogen atom,  $C_1-C_6$  alkyl group and halo  $C_1-C_6$  alkyl group),

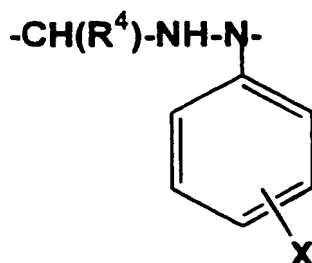


- 10 ( wherein  $R^4$  and  $X$  are as defined above, and  $R^5$  represents hydrogen atom,  $C_1-C_6$  alkylcarbonyl group or phenyl-carbonyl group which may have 1 to 2, same or different substituents selected from the group consisting of  $C_1-C_6$  alkyl groups),
- 15



(wherein  $R^4$  and  $X$  are as defined above), or

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(wherein  $R^4$  and X are as defined above);

5  $R^1$  represents hydrogen atom or  $C_1-C_6$  alkyl group;

$R^2$  and  $R^3$ , which may be same or different, represent hydrogen atom, hydroxyl group,  $C_1-C_6$  alkyl group,  $C_1-C_6$  alkoxy group,  $C_1-C_6$  alkylcarbonyl group or  
10 phenylcarbonyl group;

Y represents 1 to 5, same or different substituents selected from the group consisting of hydrogen atom, halogen atom, nitro group and cyano group;

15 Z represents halogen atom, cyano group,  $C_1-C_6$  alkyl group, halo  $C_1-C_6$  alkyl group,  $C_1-C_6$  alkoxy group, halo  $C_1-C_6$  alkoxy group, halo  $C_1-C_6$  alkylthio group, halo  $C_1-C_6$  alkylsulfinyl group or halo  $C_1-C_6$  alkylsulfonyl group; and

20 W represents oxygen atom or sulfur atom.

The ant controller of the present invention is an excellent ant controller for protecting wooden materials such as trees, board fences, sleepers, etc. and buildings such as shrines, temples, houses, outhouses,  
25 factories, etc. from ants such as termites, and for controlling ants doing harm to crops or human being.

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5           In the definition of the formula (I) shown  
above, the term "halogen atom" means chlorine atom,  
bromine atom, iodine atom and fluorine atom; the term  
"C<sub>1</sub>-C<sub>6</sub> alkyl" means a straight or branched chain alkyl  
group having 1 to 6 carbon atoms; and the term "halo C<sub>1</sub>-  
10 C<sub>6</sub> alkyl" means an alkyl group having 1 to 6 carbon atoms  
substituted with at least one, same or different halogen  
atoms.

          Preferable examples of the hydrazine  
derivative represented by the formula (I) of the present  
15 invention are the hydrazine derivatives represented by  
the formulas (I-1) and (I-2) as mentioned below.  
Preferable examples of each substituent of the hydrazine  
derivatives of formulas (I-1) and (I-2) are the  
compounds wherein W is oxygen atom, X is trifluoromethyl  
20 group, Y is cyano group, Z is trifluoromethoxy group,  
and each of R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> and R<sup>4</sup> is simultaneously a hydrogen  
atom. More preferable examples are the compounds  
wherein X is substituted on the 3-position, and Y is  
substituted on the 4-position of the phenyl ring.

25           Most preferable example is the hydrazine  
derivative represented by the formula (I-1), wherein  
each of R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> and R<sup>4</sup> is simultaneously a hydrogen  
atom, X is trifluoromethyl group substituted on the 3-  
position of the phenyl ring, Y is cyano group  
30 substituted on the 4-position of the phenyl ring, and Z  
is trifluoromethoxy group.

          Typical examples of the hydrazine derivative

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5 represented by the formula (I) used as an active ingredient of the ant controller of the present invention are shown in Table 1 to Table 4, but the present invention is by no means limited to the compounds exemplified herein.

Formula (I-1)

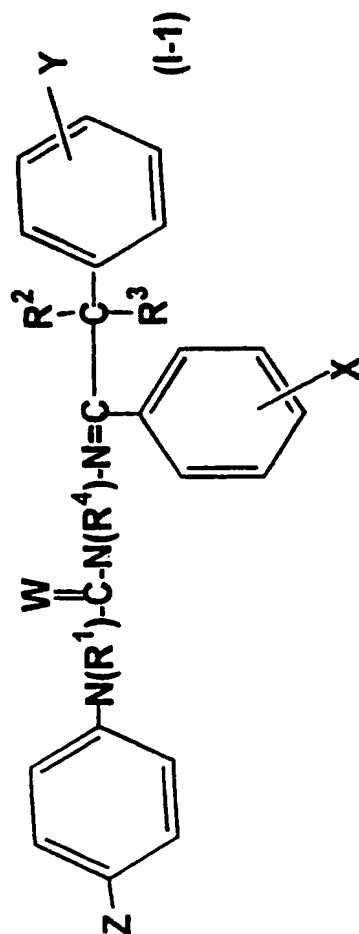


Table 1

No.	R <sup>1</sup>	R <sup>2</sup>	R <sup>3</sup>	R <sup>4</sup>	X	Y	Z	W	mp (°)
1	H	H	H	H	H	H	Cl	O	199
2	H	H	H	H	H	H	OCF <sub>3</sub>	O	149
3	H	H	H	H	H	4-Cl	Cl	O	206
4	H	H	H	H	H	4-Cl	OCF <sub>3</sub>	O	197
5	H	H	H	H	H	4-CN	Cl	O	217
6	H	H	H	H	H	4-CN	Cl	S	128
7	H	H	H	H	H	4-CN	OCF <sub>3</sub>	S	116



Table 1 (Cont'd)

No.	R <sup>1</sup>	R <sup>2</sup>	R <sup>3</sup>	R <sup>4</sup>	X	Y	Z	W	mp °
8	H	H	H	H	H	4-CN	OCF <sub>3</sub>	O	214 E-form
9	H	H	H	H	H	4-CN	OCF <sub>3</sub>	O	159 Z-form
10	H	H	H	H	H	4-NO <sub>2</sub>	Cl	O	222
11	H	H	H	H	H	4-NO <sub>2</sub>	Cl	S	206
12	H	H	H	H	H	4-NO <sub>2</sub>	OCF <sub>3</sub>	O	189
13	H	H	H	H	H	4-NO <sub>2</sub>	OCF <sub>3</sub>	S	139
14	H	H	H	H	H	4-NO <sub>2</sub>	SCF <sub>3</sub>	O	200
15	H	H	H	H	3-Cl	H	OCF <sub>3</sub>	O	212
16	H	H	H	H	3-Cl	4-Cl	OCF <sub>3</sub>	O	201
17	H	H	H	H	3-Cl	4-CN	Cl	O	206

Table 1 (Cont'd)

No.	R <sup>1</sup>	R <sup>2</sup>	R <sup>3</sup>	R <sup>4</sup>	X	Y	Z	W	mp °C
18	H	H	H	H	3-Cl	4-CN	OCF <sub>3</sub>	O	187 E-form
19	H	H	H	H	3-Cl	4-CN	OCF <sub>3</sub>	O	148 Z-form
20	H	H	H	H	3-Cl	4-CN	OCF <sub>3</sub>	S	199
21	H	H	H	H	3-Cl	4-CN	SCF <sub>3</sub>	O	215
22	H	H	H	H	3-Cl	4-CN	SO <sub>2</sub> CF <sub>3</sub>	O	205
23	H	H	H	H	3-Cl	4-CN	SO <sub>2</sub> CF <sub>3</sub>	O	212
24	H	H	H	H	3-Br	H	Cl	O	191
25	H	H	H	H	3-Br	H	OCF <sub>3</sub>	O	209
26	H	H	H	H	3-Br	4-CN	Cl	O	205
27	H	H	H	H	3-Br	4-CN	OCF <sub>3</sub>	O	176
28	H	H	H	H	3-Br	4-CN	SCF <sub>3</sub>	O	206

Table 1 (Cont'd)

No.	R <sup>1</sup>	R <sup>2</sup>	R <sup>3</sup>	R <sup>4</sup>	X	Y	Z	W	mp °
29	H	H	H	H	3-Br	4-CN	SO <sub>2</sub> CF <sub>3</sub>	O	216
30	H	H	H	H	3-Br	4-CN	SO <sub>2</sub> CF <sub>3</sub>	O	215
31	H	H	H	H	3-F	H	Cl	O	206
32	H	H	H	H	3-F	H	OCF <sub>3</sub>	O	200
33	H	H	H	H	3-F	4-Cl	OCF <sub>3</sub>	O	191
34	H	H	H	H	3-F	4-Cl	Cl	O	208
35	H	H	H	H	3-F	4-CN	OCF <sub>3</sub>	O	202
36	H	H	H	H	3-I	4-CN	Cl	O	213
37	H	H	H	H	3-I	4-CN	OCF <sub>3</sub>	O	201
38	H	H	H	H	3-CH <sub>3</sub>	H	Cl	O	185
39	H	H	H	H	3-CH <sub>3</sub>	H	OCF <sub>3</sub>	O	198
40	H	H	H	H	3-CH <sub>3</sub>	4-CN	Cl	O	200
41	H	H	H	H	3-CH <sub>3</sub>	4-CN	OCF <sub>3</sub>	O	189

Table 1 (Cont'd)

No.	R <sup>1</sup>	R <sup>2</sup>	R <sup>3</sup>	R <sup>4</sup>	X	Y	Z	W	mp □
42	H	H	H	H	3-CF <sub>3</sub>	H	Cl	O	206
43	H	H	H	H	3-CF <sub>3</sub>	H	OCF <sub>3</sub>	O	210
44	H	H	H	H	3-CF <sub>3</sub>	4-CN	OCF <sub>3</sub>	O	191
45	H	H	H	H	3-CF <sub>3</sub>	4-CN	OCF <sub>3</sub>	S	149
46	CH <sub>3</sub>	H	H	H	H	H	Cl	O	132
47	CH <sub>3</sub>	H	H	H	H	H	OCF <sub>3</sub>	O	108
48	H	CH <sub>3</sub>	H	H	H	H	Cl	O	98
49	H	CH <sub>3</sub>	H	H	H	H	Br	O	85
50	H	CH <sub>3</sub>	H	H	H	H	OCF <sub>3</sub>	O	115
									EZ-form
51	H	CH <sub>3</sub>	H	H	H	H	OCF <sub>3</sub>	O	95
									E-form
52	H	CH <sub>3</sub>	H	H	H	H	OCF <sub>3</sub>	O	66
									Z-form

Table 1 (Cont'd)

No.	R <sup>1</sup>	R <sup>2</sup>	R <sup>3</sup>	R <sup>4</sup>	X	Y	Z	W	mp [°C]
53	H	CH <sub>3</sub>	H	H	H	4-Cl	Cl	O	121
54	H	CH <sub>3</sub>	H	H	H	4-Cl	OCF <sub>3</sub>	O	105
55	H	CH <sub>3</sub>	H	H	3-Cl	4-CN	Cl	O	140
56	H	CH <sub>3</sub>	H	H	3-Cl	4-CN	OCF <sub>3</sub>	O	98
57	H	H	OH	H	H	H	Cl	O	188
58	H	H	OH	H	H	H	OCF <sub>3</sub>	O	170
59	H	H	OH	H	H	4-Cl	Cl	O	Viscous
60	H	H	OH	H	H	4-Cl	OCF <sub>3</sub>	O	185
61	H	H	OH	H	H	4-Cl	OCF <sub>3</sub>	O	E-form 95
62	H	H	OH	H	H	4-CN	Cl	O	Z-form Viscous
63	H	H	OH	H	H	4-CN	OCF <sub>3</sub>	O	113
64	H	H	CH <sub>3</sub>	H	H	H	Cl	O	164
65	H	H	CH <sub>3</sub>	H	H	H	OCF <sub>3</sub>	S	118

Table 1 (Cont'd)

No.	R <sup>1</sup>	R <sup>2</sup>	R <sup>3</sup>	R <sup>4</sup>	X	Y	Z	W	mp °C
66	H	H	OCH <sub>3</sub>	H	H	H	Cl	0	183
67	H	H	OCH <sub>3</sub>	H	H	H	OCF <sub>3</sub>	0	181
68	H	H	OC <sub>3</sub> H <sub>7</sub> -i	H	H	H	Cl	0	155
69	H	H	OC <sub>3</sub> H <sub>7</sub> -i	H	H	H	OCF <sub>3</sub>	0	193
70	H	H	OC <sub>4</sub> H <sub>9</sub> -i	H	H	H	Cl	0	176
71	H	H	OC <sub>4</sub> H <sub>9</sub> -i	H	H	H	OCF <sub>3</sub>	0	184
72	H	H	O-CO-CH <sub>3</sub>	H	H	H	OCF <sub>3</sub>	0	182
73	H	H	O-CO-Ph	H	H	H	OCF <sub>3</sub>	0	168
74	H	H	OH	CH <sub>3</sub>	H	H	Cl	0	115
75	H	H	OH	CH <sub>3</sub>	H	H	OCF <sub>3</sub>	0	130
76	H	H	H	H	3-F	4-CN	SCF <sub>3</sub>	0	214
77	H	H	H	H	3-F	4-CN	SOCF <sub>3</sub>	0	214
78	H	H	H	H	4-F	4-CN	SO <sub>2</sub> CF <sub>3</sub>	0	165
79	H	H	H	H	3-Cl	4-CN	SOCF <sub>3</sub>	0	157

Table 1 (Cont'd)

No.	R <sup>1</sup>	R <sup>2</sup>	R <sup>3</sup>	R <sup>4</sup>	X	Y	Z	W	mp °
80	H	H	H	H	3-CF <sub>3</sub>	4-CN	SCF <sub>3</sub>	O	215
81	H	H	H	H	3-CF <sub>3</sub>	4-CN	SOCF <sub>3</sub>	O	210
82	H	H	H	H	3-CF <sub>3</sub>	4-CN	OCF <sub>3</sub>	O	152
83	H	H	H	H	3-CF <sub>3</sub>	4-CN	Cl	O	Z-form 165

Note: Ph is phenyl group.

Formula (I-2)

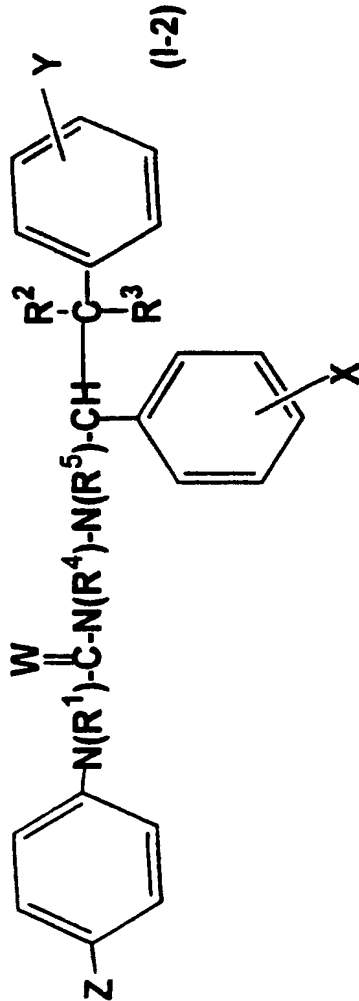


Table 2 (R<sup>1</sup> and R<sup>3</sup> are hydrogen atoms)

No.	R <sup>2</sup>	R <sup>4</sup>	R <sup>5</sup>	X	Y	Z	W	mp [°C]
84	H	H	H	H	H	Cl	O	211
85	H	H	H	H	H	OCF <sub>3</sub>	O	194
86	H	H	H	H	4-Cl	OCF <sub>3</sub>	O	209
87	H	H	H	H	4-CN	OCF <sub>3</sub>	O	204
88	H	H	H	H	4-NO <sub>2</sub>	OCF <sub>3</sub>	O	203
89	H	H	H	3-F	4-Cl	OCF <sub>3</sub>	O	203
90	H	H	H	3-Cl	4-Cl	OCF <sub>3</sub>	O	176



Table 2 (Cont'd)

No.	R <sup>2</sup>	R <sup>4</sup>	R <sup>5</sup>	X	Y	Z	W	mp °C
91	H	H	H	3-Cl	4-CN	OCF <sub>3</sub>	O	193
92	H	H	H	3-Cl	4-CN	SCF <sub>3</sub>	O	177
93	H	H	H	3-Cl	4-CN	SOCF <sub>3</sub>	O	178
94	H	H	H	3-Cl	4-CN	SO <sub>2</sub> CF <sub>3</sub>	O	170
95	H	H	H	3-Br	4-CN	OCF <sub>3</sub>	O	187
96	H	H	H	3-CF <sub>3</sub>	4-CN	OCF <sub>3</sub>	O	165
97	H	H	H	3-CF <sub>3</sub>	4-CN	SCF <sub>3</sub>	O	164
98	H	H	H	H	4-Cl	OCF <sub>3</sub>	S	171
99	H	H	H	3-Cl	4-CN	OCF <sub>3</sub>	S	149
100	H	H	H	3-CF <sub>3</sub>	4-CN	OCF <sub>3</sub>	S	209
101	H	H	CO-CH <sub>3</sub>	3-Cl	4-CN	OCF <sub>3</sub>	O	178
102	H	H	CO-Ph	3-Cl	4-CN	OCF <sub>3</sub>	O	221

Table 2 (Cont'd)

No.	R <sup>2</sup>	R <sup>4</sup>	R <sup>5</sup>	X	Y	Z	W	mp (l)
103	H	H	CONHC <sub>2</sub> H <sub>5</sub>	3-Cl	4-CN	OCF <sub>3</sub>	O	201
104	H	OH	H	H	H	OCF <sub>3</sub>	O	190
105	H	OCH <sub>3</sub>	H	H	H	Cl	O	195
106	H	OCH <sub>3</sub>	H	H	H	OCF <sub>3</sub>	O	183
107	H	OCH <sub>3</sub>	H	H	H	OCF <sub>3</sub>	O	186
108	CH <sub>3</sub>	H	H	3-Cl	4-CN	OCF <sub>3</sub>	O	156
109	H	H	H	H	4-F	OCF <sub>3</sub>	O	209
110	H	H	H	H	4-Br	Cl	O	233
111	H	H	H	H	4-Br	OCF <sub>3</sub>	O	201
112	H	H	H	H	3-CN	OCF <sub>3</sub>	O	176
113	H	H	H	H	2-NO <sub>2</sub>	OCF <sub>3</sub>	O	197
114	H	H	H	3-F	4-CN	OCF <sub>3</sub>	O	189

Table 2 (Cont'd)

No.	R <sup>2</sup>	R <sup>4</sup>	R <sup>5</sup>	X	Y	Z	W	mp [°C]
115	H	H	H	3-F	4-CN	SCF <sub>3</sub>	O	189
116	H	H	H	3-F	4-CN	SOCF <sub>3</sub>	O	166
117	H	H	H	3-CF <sub>3</sub>	4-CN	OCF <sub>3</sub>	O	131
								(-) - Isomer
118	H	H	H	3-CF <sub>3</sub>	4-CN	OCF <sub>3</sub>	O	126
								(+) - Isomer
119	H	H	H	3-CF <sub>3</sub>	4-CN	SOCF <sub>3</sub>	O	Glassy
120	H	H	H	3-CF <sub>3</sub>	4-CN	SO <sub>2</sub> CF <sub>3</sub>	O	Glassy
121	H	H	H	H	3-CN	OCF <sub>3</sub>	O	120

Note: Ph is phenyl group.

Compounds 106 and 107 are diastereomers.

Compound 106 is higher than Compound 107 in the R<sub>f</sub> value.

5 Formula (I-3)

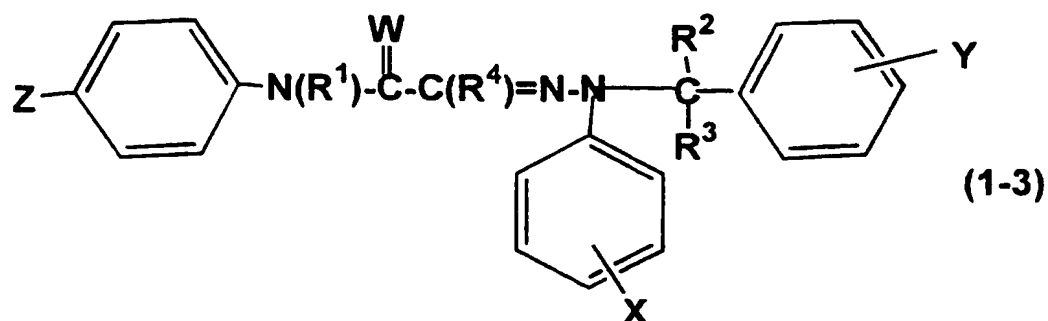


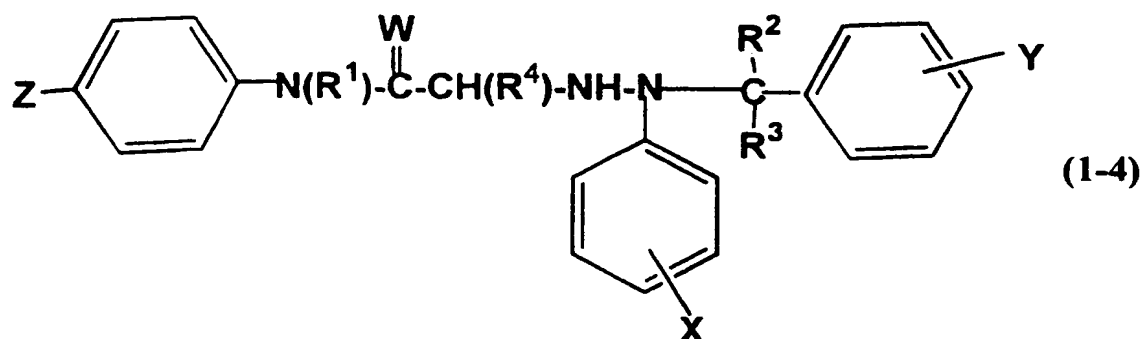
Table 3 ( $R^2$  and  $R^3$  are hydrogen atoms, and W is oxygen atom.)

No	$R^1$	$R^2$	X	Y	Z	mp $\square$ , Refractive index
122	H	H	H	H	OCF <sub>3</sub>	113.3-114.0
123	H	H	H	4-Cl	OCF <sub>3</sub>	137.8
124	H	H	H	4-CN	Cl	163
125	H	H	H	4-CN	OCF <sub>3</sub>	138
126	H	H	3-Cl	4-Cl	Cl	143.5-144.0
127	H	H	3-Cl	4-Cl	OCF <sub>3</sub>	139.6-141.5
128	H	H	3-Cl	4-NO <sub>2</sub>	Cl	174.0-176.5
129	H	H	3-Cl	4-NO <sub>2</sub>	OCF <sub>3</sub>	151.6-151.7
130	H	H	3-Cl	4-CN	Cl	191.0-192.0
131	H	H	3-Cl	4-CN	OCF <sub>3</sub>	160.5-162.0
132	H	H	3-Cl	4-CN	SCF <sub>3</sub>	188.0
133	H	H	3-Cl	4-CN	SOCF <sub>3</sub>	206.1
134	H	H	3-F	4-CN	Cl	154-156
135	H	H	3-F	4-CN	OCF <sub>3</sub>	155.9-156.8

Table 3 (Cont'd)

No	R <sup>1</sup>	R <sup>2</sup>	X	Y	Z	mp °C, Refractive index
136	H	H	3-CH <sub>3</sub>	4-CN	Cl	127
137	H	H	3-CH <sub>3</sub>	4-CN	OCF <sub>3</sub>	166
138	H	H	3-CF <sub>3</sub>	4-CN	Cl	164-165
139	H	H	3-CF <sub>3</sub>	4-CN	OCF <sub>3</sub>	151.0
140	H	CH <sub>3</sub>	3-Cl	4-CN	OCF <sub>3</sub>	nD 1.5950 (25°C)
141	CH <sub>3</sub>	H	3-CF <sub>3</sub>	4-CN	Cl	209-211
142	H	H	3-Cl	2-CN	OCF <sub>3</sub>	148

Formula (I-4)

Table 4 ( $R^1$ ,  $R^2$ ,  $R^3$  and  $R^4$  are hydrogen atoms.)

No	X	Y	Z	mp $\square$ , Refractive index
143	H	H	OCF <sub>3</sub>	51.0-53.0
144	H	4-Cl	OCF <sub>3</sub>	92.1
145	H	4-CN	Cl	106-108
146	H	4-CN	OCF <sub>3</sub>	nD 1.5685 (27 $\square$ )
147	3-Cl	4-Cl	Cl	105.3-106.4
148	3-Cl	4-Cl	OCF <sub>3</sub>	38.0
149	3-Cl	4-NO <sub>2</sub>	Cl	Viscous
150	3-Cl	4-NO <sub>2</sub>	OCF <sub>3</sub>	Viscous
151	3-Cl	4-CN	Cl	153.1
152	3-Cl	4-CN	OCF <sub>3</sub>	43.5-45.0
153	3-F	4-CN	Cl	164-165
154	3-F	4-CN	OCF <sub>3</sub>	nD 1.5615 (27 $\square$ )
155	3-CH <sub>3</sub>	4-CN	Cl	138-139
156	3-CH <sub>3</sub>	4-CN	OCF <sub>3</sub>	nD 1.5315 (28 $\square$ )
157	3-CF <sub>3</sub>	4-CN	Cl	43
158	3-CF <sub>3</sub>	4-CN	OCF <sub>3</sub>	153.1

Some of the compounds shown in Tables 1 to 4 are viscous or glassy substances. Their  $^1\text{H}$ -NMR data are summarized in Table 5.

Table 5

No	$^1\text{H}$ -NMR[ $\text{CDCl}_3/\text{TMS}$ , $\delta$ (ppm)]
59	6.29 (s, 1H), 7.65-7.92 (m, 13H), 9.14 (bs, 1H), 10.70 (bs, 1H). (DMSO- $d_6$ )
62	3.88 (bs, 1H), 3.87 (s, 1H), 6.91-7.55 (m, 13H), 7.73 (s, 1H), 8.13 (bs, 1H).
119	3.12 (dd, 1H), 3.23 (dd, 1H), 4.12-4.32 (m, 2H), 6.13 (bs, 1H), 7.24-7.93 (m, 12H), 8.08 (bs, 1H).
120	3.11 (dd, 1H), 3.23 (dd, 1H), 4.13-4.28 (m, 2H), 5.97 (s, 1H), 7.25-7.75 (m, 12H), 7.90-8.00 (bs, 1H).
149	3.65 (d, 2H), 4.20 (t, 1H), 4.70 (s, 2H), 6.85 (dd, 1H), 6.93 (dd, 1H), 7.08 (dd, 1H), 7.15-7.21 (m, 3H), 7.24 (d, 2H), 7.40 (d, 2H), 8.13 (d, 2H), 8.40 (s, 1H).
150	3.64 (s, 2H), 4.69 (s, 2H), 6.84 (dd, 1H), 6.94 (dd, 1H), 7.09 (m, 3H), 7.23 (t, 1H), 7.29 (d, 2H), 7.40 (d, 2H), 8.12 (d, 2H), 8.40 (s, 1H).

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5           The ant controller of the present invention  
exhibits a markedly high killing effect at a low dosage  
upon all the termites doing harm to houses, construction  
materials, furniture, leathers, fibers, vinyl articles,  
electric wires and cables, for example, RHINOTERMITIDAE  
10 including *Coptotermes formosanus* Shiraki, *Reticulitermes*  
*speratus* (Kolbe), *Reticulitermes hesperus* which inhabits  
the North America, *Reticulitermes tibialis*,  
*Reticulitermes flavipes*, *Reticulitermes lucifugus* which  
inhabits the shore of the Mediterranean, *Reticulitermes*  
15 *santonensis*, *Incisitermes minor* (Hagen), TERMITIDAE  
including *Odontotermes formosanus* (Shiraki),  
KALOTERMITIDAE including *Cryptotermes domesticus*  
(Haviland), TERMOPSIDAE including *Hodotermopsis japonica*  
(Holmgren), etc.

20           Further, the ant controller of the present  
invention exhibits a markedly high killing effect at a  
low dosage upon all the ants doing harm to crops, or to  
human being when the ants invade into houses and public  
facilities such as parks, for example, FORMICIDAE  
25 including *Monomorium pharaonis* Linne, *Monomorium*  
*nipponense* Wheellex, *Camponotus kiusiuensis* Santschi,  
*Formica japonica* Motschulsky, *Lasius fuliginosus*  
(Latreille), *Solenopsis richteri*, *Solenopsis invicta*,  
*Solenopsis geminata* (Fireant), etc.

30           For using the ant controller of the present  
invention containing the hydrazine derivative of formula  
(I) as an active ingredient efficiently, the ant



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5 controller is formulated with a proper solid carrier  
and/or liquid carrier. If necessary, it is formulated  
with auxiliaries in a proper proportion according to the  
conventional recipe of formulation, and homogenized  
together with the carrier by the method of dissolution,  
10 suspension, mixing, impregnation, adsorption or  
adhesion, so as to be made it into an appropriate  
preparation form such as oily solution, emulsifiable  
concentrate, solubilized concentrate, dust, granule,  
wetttable powder, aerosol, fumigant, flowable preparation  
15 or the like. It is also possible to form the termite  
controller into a bait preparation by compounding it  
with a bait containing an attractant or the like.

As the solid carrier used in the present  
invention, there can be exemplified clays such as  
20 kaolin, bentonite, acid clay and the like; talcs such as  
talc, pyrophyllite and the like; silica materials such  
as diatomaceous earth, siliceous sand, mica, synthetic  
silicate, synthetic high-dispersion silica and the like;  
and inorganic mineral powders such as pumice, sand and  
25 the like; organic matters such as pieces of wood, chips  
of pulp wood, grain flour, sugars and the like. As the  
liquid carrier, there can be exemplified alcohols such  
as methyl alcohol, ethyl alcohol, ethylene glycol and  
the like; ketones such as acetone, methyl ethyl ketone,  
30 cyclohexanone and the like; ethers such as ethyl ether,  
dioxane, tetrahydrofuran, Cellosolves and the like;  
aliphatic hydrocarbons such as light oil, kerosene and

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5 the like; aromatic hydrocarbons such as benzene,  
toluene, xylene, solvent naphtha, cyclohexanone,  
methylnaphthalene and the like; and halogenated  
hydrocarbons such as chloroform, carbon tetrachloride,  
chlorobenzene and the like. These solid and liquid  
10 carriers may be used either alone or in the form of a  
mixture.

As the auxiliaries which can be used in the  
present invention, surfactants, dispersants, sticking  
agents, etc. can be referred to. As the surfactants,  
15 there can be exemplified polyoxyethylene alkylaryl  
ethers, polyoxyethylene sorbitan monolaurates, alkylaryl  
sorbitan monolaurates, alkylbenzenesulfonates,  
alkylnaphthalene-sulfonates, ligninsulfonates, higher  
alcohol sulfuric ester salts, etc. These surfactants  
20 may be used either alone or in the form of a mixture.

As the dispersants or sticking agents, for  
example, casein, gelatin, starch, alginic acid,  
carboxymethyl cellulose, agar, polyvinyl alcohol,  
turpentine oil, etc. can be used according to the need.

25 The ant controller of the present invention is  
applied not only to the surrounding soil surface or into  
the under-floor soil in order to protect wooden  
materials such as trees, board fences, sleepers, etc.  
and structures such as shrines, temples, houses,  
30 outhouses, factories, etc., but it can also be applied  
to lumbered articles such as surfaces of the under-floor  
concrete, alcove posts, beams, plywoods, furniture,

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5 etc., wooden articles such as particle boards, half  
boards, etc. and vinyl articles such as coated electric  
wires, vinyl sheets, heat insulating material such as  
styrene foams, etc. In case of application against ants  
doing harm to crops or human beings, the ant controller  
10 of the present invention is applied to the crops or the  
surrounding soil, or is directly applied to the nest of  
ants or the like.

The present invention is not limited to the  
embodiments mentioned above, but it also includes the  
15 embodiments of applying the ant controller of the  
invention preventively to places at which occurrence of  
ants is expected.

In putting the ant controller of the present  
invention, the dosage may be appropriately selected from  
20 the ranges properly chosen. In case of application to  
wooden materials, the quantity of active ingredient  
ranges from 0.1 to 50 g per m<sup>2</sup>; and in case of soil  
treatment or application to the nests, the quantity of  
active ingredient ranges from 1 to 500 g per m<sup>2</sup>.

## 25 EXAMPLES

Next, typical examples and test example of the  
present invention are presented below. The invention is  
by no means limited to these examples.

In the examples, "parts" are by weight.

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## 5 Formulation Example 1

Each hydrazine derivative listed

in Tables 1-4 20 parts

Xylene 80 parts

10 The ingredients mentioned above were made into  
a uniform solution to obtain an oily solution.

## Formulation Example 2

Each hydrazine derivative listed

in Tables 1-4 10 parts

Polyoxyethylene styrylphenyl ether 10 parts

15 Cyclohexanone 80 parts

The ingredients mentioned above were uniformly  
mixed and dissolved together to obtain an emulsifiable  
concentrate.

## Formulation Example 3

20 Each hydrazine derivative listed

in Tables 1-4 10 parts

Sodium alkylbenzenesulfonate 2 parts

White carbon 10 parts

Clay 78 parts

25 The ingredients mentioned above were uniformly  
mixed and pulverized to obtain a wettable powder.

## Formulation Example 4

Each hydrazine derivative listed

in Tables 1-4 8 parts



Table 6

Compound No.	Termite-killing effect	Compound No.	Termite-killing effect
1	A	5	A
2	B	6	A
3	A	7	A
4	A	8	C

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5 Table 6 (Cont'd)

Compound No.	Termite-killing effect	Compound No.	Termite-killing effect
9	B	32	A
10	A	33	C
11	A	34	A
12	A	35	A
13	A	36	B
14	A	37	A
15	B	38	B
16	C	39	A
17	A	40	D
18	A	41	A
19	A	42	A
20	A	43	A
21	A	44	C
22	B	45	A
23	A	46	A
24	C	47	A
25	D	48	A
26	A	49	C
27	A	50	A
28	C	51	A
29	C	52	A
30	A	53	B
31	A	54	A

5 Table 6 (Cont'd)

Compound No.	Termite-killing effect	Compound No.	Termite-killing effect
55	A	78	A
56	A	79	B
57	D	80	A
58	A	81	A
59	C	82	B
60	C	83	D
61	A	84	A
62	A	85	C
63	A	86	A
64	A	87	C
65	C	88	A
66	A	89	B
67	A	90	A
68	A	91	A
69	B	92	A
70	A	93	D
71	A	94	A
72	A	95	A
73	A	96	A
74	A	97	A
75	A	98	A
76	A	99	A
77	A	100	A



5 Table 6 (Cont'd)

Compound No.	Termite-killing effect	Compound No.	Termite-killing effect
101	A	124	D
102	A	125	A
103	A	126	A
104	A	127	A
105	B	128	A
106	A	129	A
107	D	130	C
108	C	131	C
109	C	132	A
110	B	133	A
111	D	134	A
112	A	135	B
113	A	136	A
114	B	137	A
115	A	138	A
116	B	139	A
117	A	140	A
118	D	141	D
119	A	142	C
120	A	143	C
121	C	144	B
122	D	145	A
123	A	146	D

5 Table 6 (Cont'd)

Compound No.	Termite-killing effect	Compound No.	Termite-killing effect
147	A	153	A
148	A	154	B
149	A	155	A
150	C	156	B
151	C	157	A
152	B	158	C

## Test Example 2

The ant controller of the present invention  
10 was applied to nests (anthill) of fireant (*Solenopsis*  
*geminata*) with drench treatment, in terms of 1 g of the  
active ingredient per one nest. 14 Days after the  
treatment of the ant controller, the activity of the  
nests was evaluated according to the following  
15 criterion. The test was carried out with one block per  
one nest.

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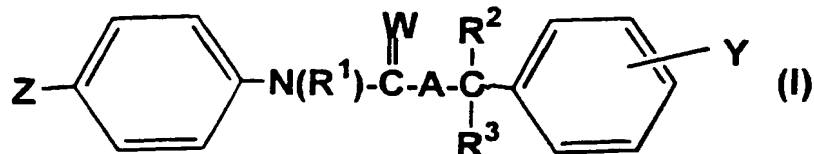
5	Criterion	Effect
	A	Nest is completely destructed or activity of the nest is extremely low.
	B	Activity of the nest is exhibited.
10	C	High activity of the nest is exhibited.
	D	Activity of the nest is extremely high.

As a result of the test, compound Nos. 44 and 96 of the present invention exhibited the effect "A".

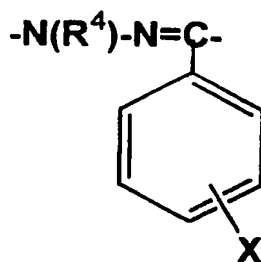
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WHAT IS CLAIMED IS:

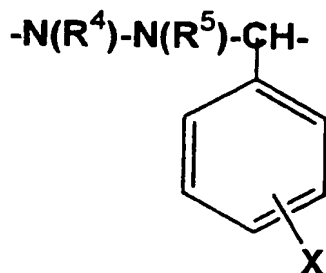
1. An ant controller characterized by containing, as active ingredient thereof, a hydrazine derivative represented by the following formula (I):



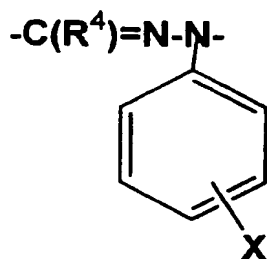
wherein A represents:



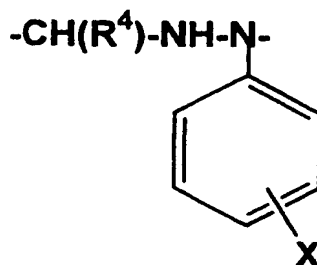
(wherein  $\text{R}^4$  represents hydrogen atom or  $\text{C}_1\text{-C}_6$  alkyl group, and X represents 1 to 5, same or different substituents selected from the group consisting of hydrogen atom, halogen atom,  $\text{C}_1\text{-C}_6$  alkyl group and halo  $\text{C}_1\text{-C}_6$  alkyl group),



(wherein  $R^4$  and X are as defined above, and  $R^5$  represents hydrogen atom,  $C_1$ - $C_6$  alkylcarbonyl group or phenylcarbonyl group which may have 1 to 2, same or different substituents selected from the group consisting of  $C_1$ - $C_6$  alkyl groups),



(wherein  $R^4$  and X are as defined above), or



(wherein  $R^4$  and X are as defined above);

$R^1$  represents hydrogen atom or  $C_1$ - $C_6$  alkyl group;

$R^2$  and  $R^3$ , which may be same or different, represent hydrogen atom, hydroxyl group,  $C_1$ - $C_6$  alkyl group,  $C_1$ - $C_6$  alkoxy group,  $C_1$ - $C_6$  alkylcarbonyl group or phenylcarbonyl group;

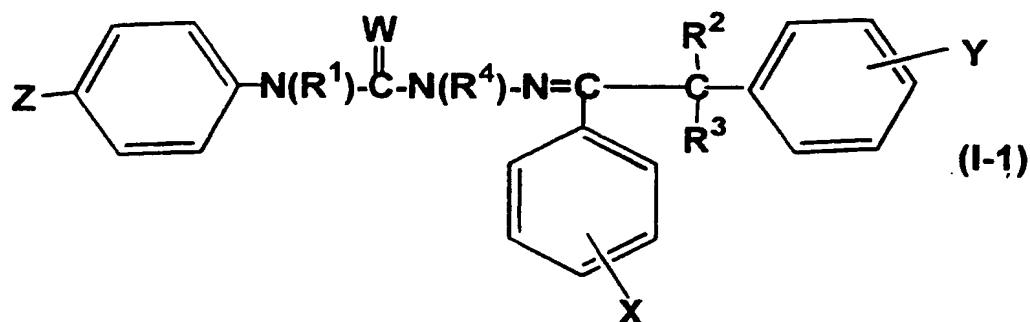
Y represents 1 to 5, same or different substituents selected from the group consisting of

hydrogen atom, halogen atom, nitro group and cyano group;

Z represents halogen atom, cyano group, C<sub>1</sub>-C<sub>6</sub> alkyl group, halo C<sub>1</sub>-C<sub>6</sub> alkyl group, C<sub>1</sub>-C<sub>6</sub> alkoxy group, halo C<sub>1</sub>-C<sub>6</sub> alkoxy group, halo C<sub>1</sub>-C<sub>6</sub> alkylthio group, halo C<sub>1</sub>-C<sub>6</sub> alkylsulfinyl group or halo C<sub>1</sub>-C<sub>6</sub> alkylsulfonyl group; and

W represents oxygen atom or sulfur atom.

2. The ant controller according to Claim 1, which is represented by the following formula (I-1):



wherein R<sup>1</sup> represents hydrogen atom or C<sub>1</sub>-C<sub>6</sub> alkyl group;

R<sup>2</sup> and R<sup>3</sup>, which may be same or different, represent hydrogen atom, hydroxyl group, C<sub>1</sub>-C<sub>6</sub> alkyl group, C<sub>1</sub>-C<sub>6</sub> alkoxy group, C<sub>1</sub>-C<sub>6</sub> alkylcarbonyl group or phenylcarbonyl group;

R<sup>4</sup> represents hydrogen atom or C<sub>1</sub>-C<sub>6</sub> alkyl group;

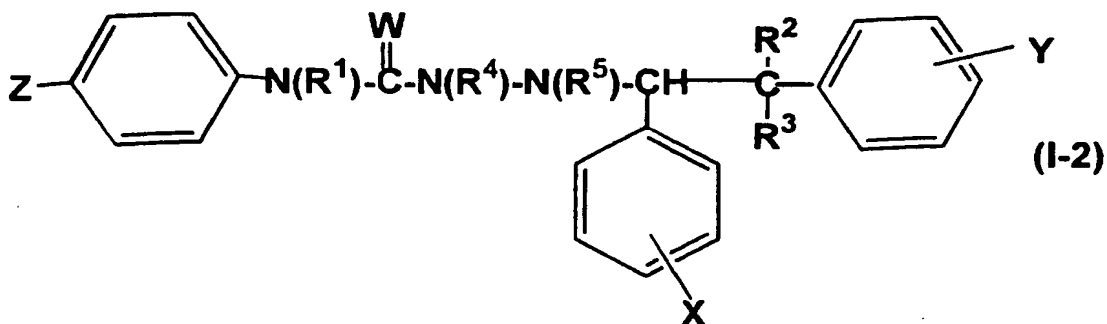
X represents 1 to 5, same or different substituents selected from the group consisting of hydrogen atom, halogen atom, C<sub>1</sub>-C<sub>6</sub> alkyl group and halo C<sub>1</sub>-C<sub>6</sub> alkyl group;

Y represents 1 to 5, same or different substituents selected from the group consisting of hydrogen atom, halogen atom, nitro group and cyano group;

Z represents halogen atom, cyano group, C<sub>1</sub>-C<sub>6</sub> alkyl group, halo C<sub>1</sub>-C<sub>6</sub> alkyl group, C<sub>1</sub>-C<sub>6</sub> alkoxy group, halo C<sub>1</sub>-C<sub>6</sub> alkoxy group, halo C<sub>1</sub>-C<sub>6</sub> alkylthio group, halo C<sub>1</sub>-C<sub>6</sub> alkylsulfinyl group or halo C<sub>1</sub>-C<sub>6</sub> alkylsulfonyl group; and

W represents oxygen atom or sulfur atom.

3. The ant controller according to Claim 1, which is represented by the following formula (I-2):



wherein R<sup>1</sup> represents hydrogen atom or C<sub>1</sub>-C<sub>6</sub> alkyl group;

R<sup>2</sup> and R<sup>3</sup>, which may be same or different, represent hydrogen atom, hydroxyl group, C<sub>1</sub>-C<sub>6</sub> alkyl group, C<sub>1</sub>-C<sub>6</sub> alkoxy group, C<sub>1</sub>-C<sub>6</sub> alkylcarbonyl group or phenylcarbonyl group;

R<sup>4</sup> represents hydrogen atom or C<sub>1</sub>-C<sub>6</sub> alkyl group;

R<sup>5</sup> represents hydrogen atom, C<sub>1</sub>-C<sub>6</sub> alkylcarbonyl group or phenylcarbonyl group which may

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have 1 to 2, same or different substituents selected from the group consisting of C<sub>1</sub>-C<sub>6</sub> alkyl groups;

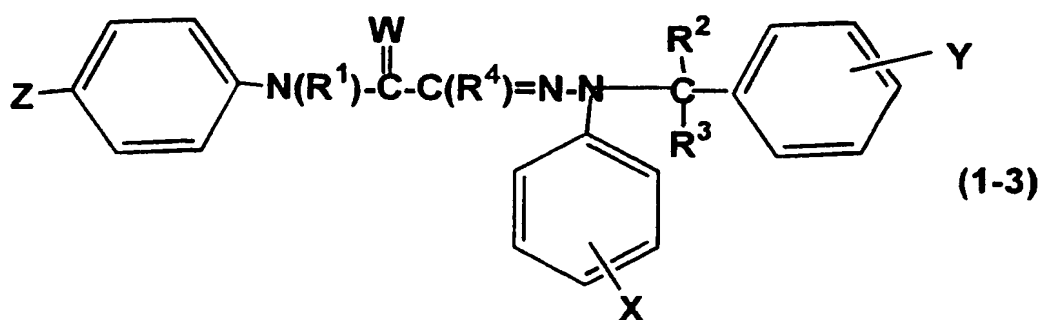
X represents 1 to 5, same or different substituents selected from the group consisting of hydrogen atom, halogen atom, C<sub>1</sub>-C<sub>6</sub> alkyl group and halo C<sub>1</sub>-C<sub>6</sub> alkyl group;

Y represents 1 to 5, same or different substituents selected from the group consisting of hydrogen atom, halogen atom, nitro group and cyano group;

Z represents halogen atom, cyano group, C<sub>1</sub>-C<sub>6</sub> alkyl group, halo C<sub>1</sub>-C<sub>6</sub> alkyl group, C<sub>1</sub>-C<sub>6</sub> alkoxy group, halo C<sub>1</sub>-C<sub>6</sub> alkoxy group, halo C<sub>1</sub>-C<sub>6</sub> alkylthio group, halo C<sub>1</sub>-C<sub>6</sub> alkylsulfinyl group or halo C<sub>1</sub>-C<sub>6</sub> alkylsulfonyl group; and

W represents oxygen atom or sulfur atom.

4. The ant controller according to Claim 1, which is represented by the following formula (I-3):



wherein R<sup>1</sup> represents hydrogen atom or C<sub>1</sub>-C<sub>6</sub> alkyl group;

R<sup>2</sup> and R<sup>3</sup>, which may be same or different, represent hydrogen atom, hydroxyl group, C<sub>1</sub>-C<sub>6</sub> alkyl group, C<sub>1</sub>-C<sub>6</sub> alkoxy group, C<sub>1</sub>-C<sub>6</sub> alkylcarbonyl group or



phenylcarbonyl group;

$R^1$  represents hydrogen atom or  $C_1-C_6$  alkyl group;

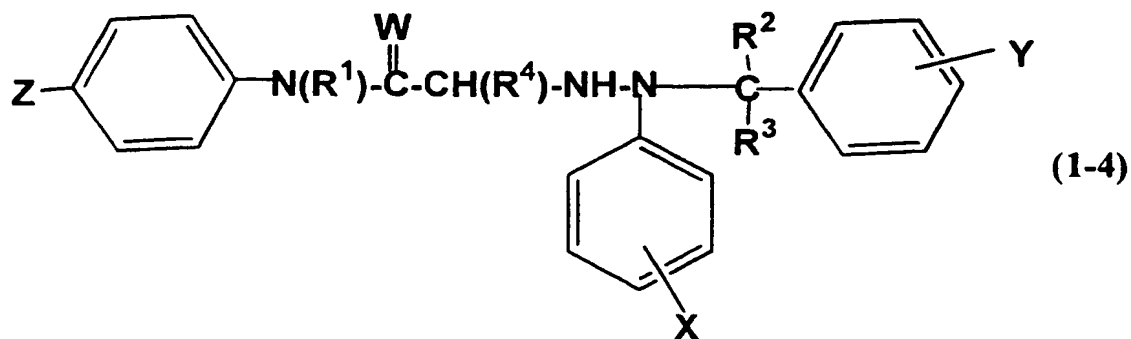
X represents 1 to 5, same or different substituents selected from the group consisting of hydrogen atom, halogen atom,  $C_1-C_6$  alkyl group and halo  $C_1-C_6$  alkyl group;

Y represents 1 to 5, same or different substituents selected from the group consisting of hydrogen atom, halogen atom, nitro group and cyano group;

Z represents halogen atom, cyano group,  $C_1-C_6$  alkyl group, halo  $C_1-C_6$  alkyl group,  $C_1-C_6$  alkoxy group, halo  $C_1-C_6$  alkoxy group, halo  $C_1-C_6$  alkylthio group, halo  $C_1-C_6$  alkylsulfinyl group or halo  $C_1-C_6$  alkylsulfonyl group; and

W represents oxygen atom or sulfur atom.

5. The ant controller according to Claim 1, which is represented by the following formula (I-4):



wherein  $R^2$  represents hydrogen atom or  $C_1-C_6$  alkyl group;

$R^2$  and  $R^3$ , which may be same or different,

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represent hydrogen atom, hydroxyl group, C<sub>1</sub>-C<sub>6</sub> alkyl group, C<sub>1</sub>-C<sub>6</sub> alkoxy group, C<sub>1</sub>-C<sub>6</sub> alkylcarbonyl group or phenylcarbonyl group;

R<sup>4</sup> represents hydrogen atom or C<sub>1</sub>-C<sub>6</sub> alkyl group;

X represents 1 to 5, same or different substituents selected from the group consisting of hydrogen atom, halogen atom, C<sub>1</sub>-C<sub>6</sub> alkyl group and halo C<sub>1</sub>-C<sub>6</sub> alkyl group;

Y represents 1 to 5, same or different substituents selected from the group consisting of hydrogen atom, halogen atom, nitro group and cyano group;

Z represents halogen atom, cyano group, C<sub>1</sub>-C<sub>6</sub> alkyl group, halo C<sub>1</sub>-C<sub>6</sub> alkyl group, C<sub>1</sub>-C<sub>6</sub> alkoxy group, halo C<sub>1</sub>-C<sub>6</sub> alkoxy group, halo C<sub>1</sub>-C<sub>6</sub> alkylthio group, halo C<sub>1</sub>-C<sub>6</sub> alkylsulfinyl group or halo C<sub>1</sub>-C<sub>6</sub> alkylsulfonyl group; and

W represents oxygen atom or sulfur atom.

6. A method for application of an ant controller which comprises treating a wooden part and a surrounding soil where ants and termites live, with an effective quantity of the ant controller according to Claim 1.

7. The method for application of an ant controller according to Claim 6, wherein the hydrazine derivative represented by the general formula (I) is a hydrazine derivative claimed in any one of Claims 2 to 5.

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/17895

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 A01N47/34 A01N37/44

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A01N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

CHEM ABS Data, WPI Data, EPO-Internal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 92 06076 A (DU PONT) 16 April 1992 (1992-04-16) page 54, line 32 -page 55, line 17 claim 1; table A ---	1,2,6,7
X	EP 0 462 456 A (NIHON NOHYAKU CO LTD) 27 December 1991 (1991-12-27) cited in the application page 1; claim 1; example A004 ---	1,2,6,7
X	EP 0 500 111 A (ISHIHARA MINING & CHEMICAL CO) 26 August 1992 (1992-08-26) page 38, line 55 -page 39, line 2; claim 1; example 200 --- -/--	1,2,6,7

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

28 August 2000

Date of mailing of the international search report

23. 11. 00

Name and mailing address of the ISA

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Authorized officer

Bertrand, F

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/17895

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>WO 94 11340 A (NIPPON SODA CO ;KISHIMOTO TAKASHI (JP); MATSUDA MICHIIKO (JP); HA) 26 May 1994 (1994-05-26) abstract; example 12 -----</p>	1,2

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US 00/17895

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1, 6, 7 (all partly)

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1,6,7 (all partly) and 2

Ant controller and method of its application, involving a compound of general formula I-1

2. Claims: 1,6,7 (all partly) and 3

Ant controller and method of its application, involving a compound of general formula I-2

3. Claims: 1,6,7 (all partly) and 4

Ant controller and method of its application, involving a compound of general formula I-3

4. Claims: 1,6,7 (all partly) and 5

Ant controller and method of its application, involving a compound of general formula I-4

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 00/17895

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9206076 A	16-04-1992	AU 9028991 A CA 2093351 A EP 0553284 A JP 6502414 T	28-04-1992 06-04-1992 04-08-1993 17-03-1994
EP 0462456 A	27-12-1991	AU 631995 B AU 7833291 A CN 1057646 A,B CN 1103065 A,B DE 69119301 D DE 69119301 T ES 2089056 T JP 2805255 B JP 5004958 A KR 9502840 B US 5543573 A ZA 9104232 A JP 2805256 B JP 5017428 A	10-12-1992 19-12-1991 08-01-1992 31-05-1995 13-06-1996 17-10-1996 01-10-1996 30-09-1998 14-01-1993 27-03-1995 06-08-1996 24-02-1993 30-09-1998 26-01-1993
EP 0500111 A	26-08-1992	BR 9200586 A CA 2061214 A CN 1064481 A EG 19569 A HU 60595 A JP 5279312 A MX 9200731 A NZ 241574 A RO 108451 B US 5288727 A ZA 9201240 A	27-10-1992 23-08-1992 16-09-1992 29-06-1995 28-10-1992 26-10-1993 01-09-1992 26-08-1993 31-05-1994 22-02-1994 25-11-1992
WO 9411340 A	26-05-1994	JP 6157444 A AU 5433794 A	03-06-1994 08-06-1994

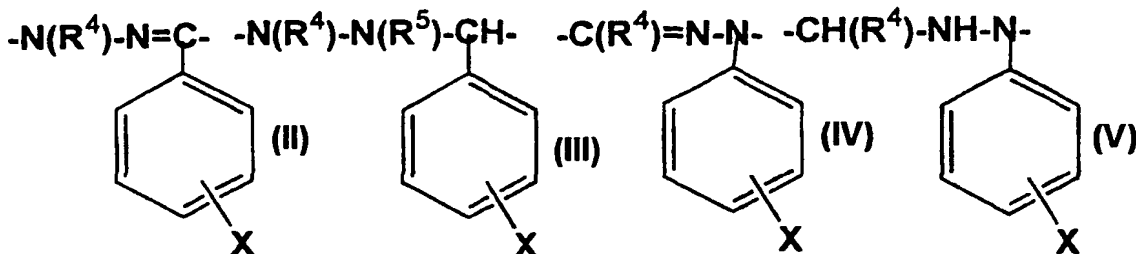
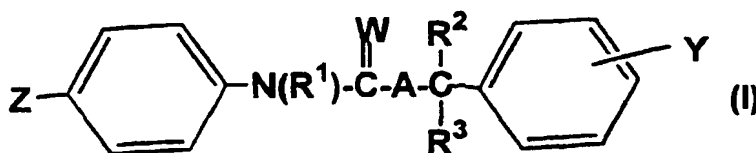
(19) World Intellectual Property Organization  
International Bureau(43) International Publication Date  
11 January 2001 (11.01.2001)

PCT

(10) International Publication Number  
WO 01/01781 A1

- (51) International Patent Classification<sup>7</sup>: A01N 47/34, 37/44
- (21) International Application Number: PCT/US00/17895
- (22) International Filing Date: 28 June 2000 (28.06.2000)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
11/190671 5 July 1999 (05.07.1999) JP
- (71) Applicant (for all designated States except US): AMERICAN CYANAMID COMPANY [US/US]; Five Giralda Farms, Madison, NJ 07940 (US).
- (72) Inventors; and  
(75) Inventors/Applicants (for US only): TAKAGI, Kazuhiro [JP/JP]; 4-12-10-1124, Kitahorie, Nishi-ku, Osaka-shi, Osaka-fu (JP). WADA, Yasuhiro [JP/JP]; 3-952-7, Higashi-ikejiri, Osakasayama-shi, Osaka-fu (JP). YAMAGUCHI, Rikio [JP/JP]; 2-5-202, Honmachi, Kawachinagano-shi, Osaka-fu (JP).
- (74) Agents: HOGAN, John, W. et al.; American Home Products Corporation, Patent Law Dept. 2B2, One Campus Drive, Parsippany, NJ 07054 (US).
- (81) Designated States (national): AT, AU, BR, CA, CH, CR, DE, DK, ES, FI, GB, HU, IL, IN, KE, MX, NO, NZ, PL, PT, SE, TR, US, ZA, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
- Published:  
— With international search report.  
— With amended claims.
- Date of publication of the amended claims: 14 June 2001
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: ANT CONTROLLERS AND METHOD FOR APPLICATION THEREOF



(57) Abstract: The present invention provides an excellent ant controller for protecting wooden materials such as trees, board fences, sleepers, etc. and structures such as shrines, temples, houses, outhouses, factories, etc. from termites, and for controlling ants doing harm to crops or humans, which contains as active ingredient thereof a hydrazine derivative represented by general formula (I) [wherein A represents one of formulas (II), (III), (IV), and (V), (wherein R<sup>4</sup> and R<sup>5</sup> are H, C<sub>1</sub>-C<sub>6</sub> alkyl, etc.; X is 1 to 5 substituents selected from H, halogen and (halo) C<sub>1</sub>-C<sub>6</sub> alkyl); R<sup>1</sup> is H or C<sub>1</sub>-C<sub>6</sub> alkyl; R<sup>2</sup> and R<sup>3</sup> are H, OH, C<sub>1</sub>-C<sub>6</sub> alkyl, phenylcarbonyl, etc.; Y is 1 to 5 substituents selected from H, halogen, nitro and cyano; Z is halogen, cyano, C<sub>1</sub>-C<sub>6</sub> alkyl, etc.; and W is O or S]; and a method for application of the ant controller.

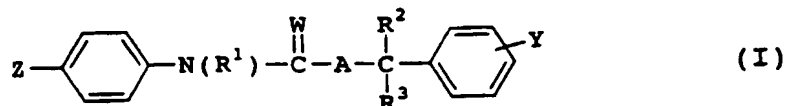
WO 01/01781 A1



## AMENDED CLAIMS

[received by the International Bureau on 12 December 2000 (12.12.00);  
original claims 1-7 replaced by new claims 1-10 (3 pages)]

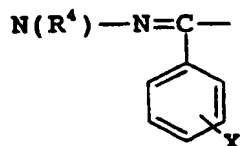
1. A method for combating pests selected from the Isoptera, Hymenoptera, Orthoptera, and Psocoptera orders by applying a hydrazine derivative represented by the following formula (I):



R<sup>1</sup> represents hydrogen or C<sub>1</sub>-C<sub>6</sub> alkyl;

R<sup>2</sup> and R<sup>3</sup>, which may be same or different, represent hydrogen, hydroxyl, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, C<sub>1</sub>-C<sub>6</sub> alkylcarbonyl or phenylcarbonyl;

A represents

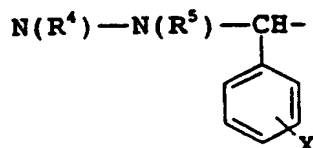


wherein

R<sup>4</sup> represents hydrogen or C<sub>1</sub>-C<sub>6</sub> alkyl, and

X represents 1 to 5 same or different substituents selected from the group consisting of hydrogen, halogen, C<sub>1</sub>-C<sub>6</sub> alkyl and halo C<sub>1</sub>-C<sub>6</sub> alkyl,

or

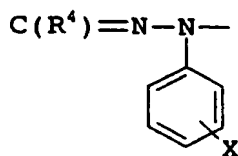


wherein R<sup>4</sup> and X are as defined above, and

R<sup>5</sup> represents hydrogen, C<sub>1</sub>-C<sub>6</sub> alkylcarbonyl or phenylcarbonyl which may have 1 to 2 same or different substituents C<sub>1</sub>-C<sub>6</sub> alkyl,

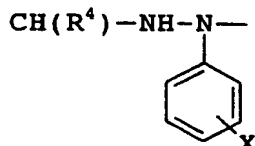
AMENDED SHEET (ARTICLE 19)

or



wherein R<sup>4</sup> and X are as defined above,

or



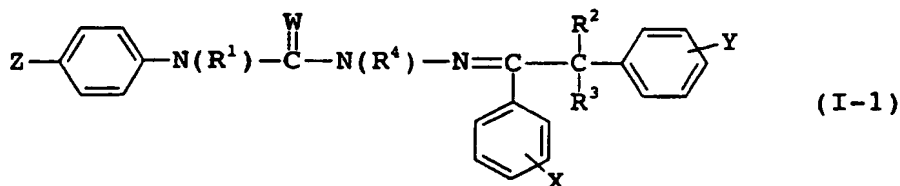
wherein R<sup>4</sup> and X are as defined above;

Y represents 1 to 5 same or different substituents selected from the group consisting of hydrogen, halogen, nitro and cyano;

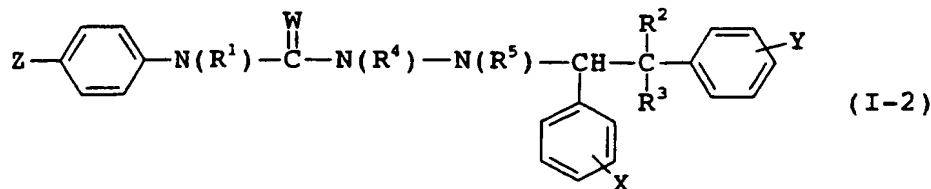
Z represents halogen, cyano, C<sub>1</sub>-C<sub>6</sub> alkyl, halo C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, halo C<sub>1</sub>-C<sub>6</sub> alkoxy, halo C<sub>1</sub>-C<sub>6</sub> alkylthio, halo C<sub>1</sub>-C<sub>6</sub> alkylsulfinyl or halo C<sub>1</sub>-C<sub>6</sub> alkylsulfonyl; and

W represents oxygen or sulfur.

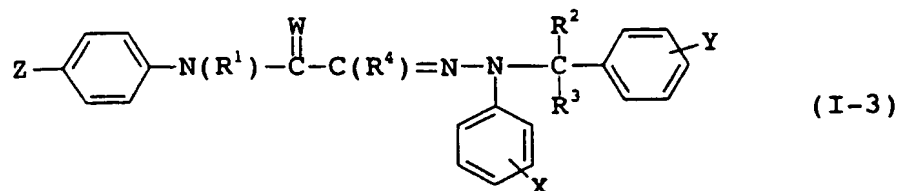
2. The method of claim 1 wherein the hydrazine derivative is represented by the following formula (I-1):



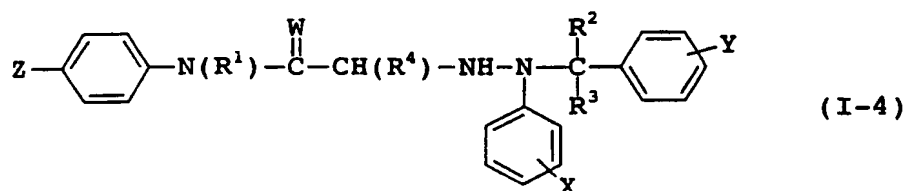
3. The method of claim 1 wherein the hydrazine derivative is represented by the following formula (I-2):



4. The method of claim 1 wherein the hydrazine derivative is represented by the following formula (I-3):



5. The method of claim 1 wherein the hydrazine derivative is represented by the following formula (I-4):



6. The method of claim 1 wherein the pests are selected from the Rhinotermitidae, Termitidae, Kalotermitidae, Termopsidae, and Formicidae family.
7. The method of any one of claims 1 to 6 wherein the hydrazine derivative is applied in amounts of 0,1 to 500 g/m<sup>2</sup>.
8. A method for protecting wooden materials against pests from the Rhinotermitidae, Termitidae, Kalotermitidae, and Termopsidae family by applying a hydrazine derivative as defined in any one of claims 1 to 5.
9. The method of claim 8 wherein the hydrazine derivative is applied in amounts of 0,1 to 50 g/m<sup>2</sup>.
10. The method of claim 9 wherein the hydrazine derivative is represented by formula I-1 as defined in claim 2.